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**Directorate of
Intelligence**

Science and Weapons
Daily Review

**Wednesday
6 February 1985**

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The USSR lags the United States in all seven of the major
areas of general-purpose digital computer technology
examined: micro-processors, internal memories,
minicomputers, mainframes, large scientific computers,
software, and peripheral equipment. The US lead is expected
to continue to increase at least through the mid-1980s and,
barring unexpected Soviet technological breakthroughs,
probably through the remainder of the 1980s.   25X1

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KEY JUDGMENTS: SOVIET GENERAL-PURPOSE DIGITAL COMPUTER TECHNOLOGY

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The United States leads the USSR in all fields of general-purpose digital computer technology. This lead ranges from at least three years for internal memory devices to more than 10 years in high-performance magnetic storage systems. In general, the outlook for the remainder of the 1980s will be for the US lead to increase, although, for some high-priority applications, the Soviets may be able to reduce or design around a particular technology gap.

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The Soviets have made progress both in computer technology and in computer production techniques; however, their progress has been overwhelmed by the rapid advances made in the West and Japan.

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There are many reasons why the Soviets trail the United States in computer technology:

-- The Soviets' centrally planned economy does not permit adequate flexibility to respond to design or manufacturing changes frequently encountered in computer production; this situation has often resulted in a shortage of critical components--especially for new products.

-- The extraordinary compartmentalization of information in the USSR-- especially on technologies with potential military applications; compartmentalization not only restricts the flow of information, but also results in much duplication of work because of a lack of knowledge about other activities.

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    -- The Soviet preoccupation with meeting production quotas, frequently at the expense of component and system quality control.

    -- The lack of adequate incentives for Soviet managers to take the risks associated with innovations or new technology.

    -- Poor coordination between separate design institutes and production facilities, sometimes resulting in products that have to be redesigned to fit a factory's production capabilities.

    -- The Soviets' lag in computer-aided design and computer-aided manufacturing techniques caused by a belated development start and also, ironically, by the Soviets' lag in computer technology.

    -- Concerns by Soviet officials that a computer is a powerful tool that could be used for antirevolutionary activity; these concerns tend to restrict access to and first-hand knowledge about computers as well as their applications.

    -- Provincial disputes within and between ministerial and institutional organizations.

    -- Very poor customer support--including inadequate user feedback, poor installation support, and delayed maintenance--that frequently results in reduced efficiency and productivity for computer usage.

Similar reasons also account for the Soviet lag in microelectronics technology as well as instrumentation and test equipment; these technology lags in components and tools that are essential for modern computers contribute directly to the Soviet lag in computer technology. It is unlikely that the entrenched Soviet bureaucracy--which tends to favor the status quo--will take the necessary steps in the foreseeable future to correct many of these well-recognized problems.

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The Soviet lag in computer technology and production is resulting in a lag in both civilian and military computer applications. We believe that the Soviets have sufficient numbers of computers for highest priority, low-volume military and civilian projects. It is the remaining user community, including Eastern Bloc allies, who will experience shortages and delays in obtaining their desired computer systems. The shortage of Soviet automation equipment is expected to hinder seriously the modernization of their industrial base and also the growth of their economy.

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The Soviets also lag the United States in computer technology used in their fielded military systems. Historically, there has been a tendency in the USSR to avoid the complex multimission military systems—for which computers are an essential subsystem—that are frequently preferred in the United States. It is likely that the conservative Soviet philosophy in weapons design has not taxed Soviet computer capabilities in the past. However, this approach may be changing. We believe that the Soviets will be forced to incorporate more advanced technology into their weapon systems in order to stay competitive with Western military development.

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The Soviets' most significant hardware deficiencies are in supercomputers and high-performance input/output systems, especially magnetic disk technology. We do not expect the Soviets to have a supercomputer until about 1985, whereas the first US commercial supercomputer was delivered in 1976. In magnetic disk systems, the Soviets are about a decade behind the United States. Lags in these critical areas will constrain Soviet computer system performance for applications requiring high-speed capabilities, such as ballistic missile defense, and applications requiring high input/output data rates, such as large real-time command, control, and communications systems. In the software arena, the number of experienced Soviet programmers who are also cleared for classified projects may still be insufficient to complete all priority projects on time.
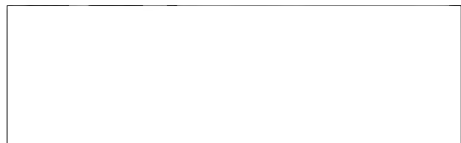
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We expect the Soviets' future progress in computer technology to be heavily dependent upon their advances in microelectronics and in secondary storage technology, and upon their continued activity in legally and illegally acquiring Western and Japanese technology. Judging from past performance and current technology assessments, we expect the Soviets to fall further behind the United States throughout the 1980s. However, if the Soviets obtained turnkey production facilities or detailed production know-how from

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the West or Japan--as they have done in the past--they would be able to narrow, at least temporarily, a specific technology gap. Also, if they made a major technological breakthrough in areas where they appear to be investing heavily, such as in optical computing or optical storage, the Soviets could overcome many of their deficiencies in high-performance computers.

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